In the Claims

Please amend the claims as follows:

1. A method of bonding balls of solder to bond pads on a substrate comprising:

dipping the substrate into a volume of the balls of solder;

contemporaneously retaining at least two of the balls of solder over different respective bond pads on the substrate in the absence of flux; and

with the at least two balls of solder so retained, exposing the at least two balls of solder to bonding conditions effective to bond the at least two balls of solder with their associated bond pads.

2. The method of claim 1, wherein exposing comprises laser-bonding the at least two balls of solder.

3. A method of bonding balls of solder to bond pads on a substrate comprising:

placing at least portions of a plurality of balls of solder within a frame and in registered alignment with individual bond pads over the substrate by dipping the substrate into a volume of the balls of solder; and

while the ball portions are within the frame, exposing the balls to bonding conditions effective to bond the balls with their associated bond pads.

6. The method of claim 3, wherein exposing comprises laser bonding the balls with their associated bond pads.

8. The method of claim 3, wherein exposing comprises laser bonding the balls with their associated bond pads by fixing the position of a laser beam and moving the frame relative to the laser beam from ball-to-ball.

11. The method of claim 3, wherein:

placing comprises placing individual balls within individual holes within the frame; and

exposing comprises reflowing the balls while the balls are within their individual holes, and further comprising, after reflowing, removing the frame from around the reflowed balls.

13. A method of bonding balls of solder to bond pads on a substrate comprising:

providing a frame having a plurality of holes sized to receive individual solder balls;

delivering individual balls of solder into the holes from over the frame by dipping the substrate into a volume of the balls of solder;

placing the balls into registered alignment, while the balls are in the holes, with a plurality of individual bond pads over the substrate; and

bonding the balls with their individual associated bond pads.

20. The method of claim 13, wherein bonding comprises laser bonding the balls with their individual associated bond pads.

22. The method of claim 13, wherein bonding comprises laser bonding the balls with their individual associated bond pads by fixing the position of a laser beam and moving the frame relative to the laser beam from ball-to-ball to effectuate the bonding.

23. A method of bonding solder balls to bond pads on a substrate comprising:

providing a frame having a plurality of holes;

inserting individual solder balls into the holes by dipping the substrate into a volume of the balls of solder, the balls being small enough to pass through the holes;

placing the frame into proximity with the substrate having bond pads positioned thereon, more than one of the plurality of holes holding an individual solder ball therewithin and in registered alignment with an associated bond pad on the substrate;

laser-bonding the solder balls to their individual bond pad; and

after the laser bonding, removing the frame from proximity with the substrate.

26. The method of claim 23, wherein said laser-bonding comprises moving individual solder balls relative to a generally-fixed laser beam.

27. A method of bonding a ball of solder to a bond pad on a substrate comprising:

providing a frame having a hole;

providing a ball of solder having an outer surface;

retaining the ball of solder within the hole in an ambient processing environment which is generally uniform over the entirety of the ball's outer surface by dipping the substrate into a volume of the balls of solder; and

while the ball of solder is within the hole, bonding the ball of solder with an associated bond pad on the substrate.

30. The method of claim 27, wherein bonding comprises laser bonding the ball.

31. A method of bonding balls of solder to bond pads on a substrate comprising:

providing a surface having a plurality of holes therein;

providing a plurality of balls of solder over the surface by dipping the substrate into a volume of the balls of solder;

depositing some of the balls of solder into at least some of the holes; and

bonding the balls of solder which were deposited into the holes to individual associated bond pads positioned on the substrate proximate the holes.

36. The method of claim 31, wherein bonding comprises laser-bonding each ball to an associated one of the individual associated bond pads.

37. The method of claim 31, wherein bonding comprises laser-bonding each ball to an associated one of the individual associated bond pads by fixing the position of a laser beam and moving each ball into the path of the laser beam.

45. The method of claim 1, wherein exposing comprises melting the at least two balls.

48. A method of bonding balls of solder to bond pads on a substrate comprising:

placing at least portions of a plurality of balls of solder within a frame and in registered alignment with individual bond pads over the substrate by dipping the substrate into a volume of the balls of solder; and

while the ball portions are within the frame, exposing the balls to bonding conditions effective to bond the balls with their associated bond pads by laser bonding the balls with their associated bond pads.

49. The method of claim 48, wherein exposing the balls to bonding conditions effective to bond the balls comprises laser bonding the balls with their associated bond pads by fixing the position of a laser beam and moving the frame relative to the laser beam from ball-to-ball.

50. The method of claim 48, wherein:

placing comprises placing individual balls within individual holes within the frame; and

exposing the balls to bonding conditions effective to bond the balls comprises reflowing the balls by laser bonding while the balls are within their individual holes, and further comprising, after reflowing, removing the frame from around the reflowed balls.

New Claims

51. A fluxless process for bonding balls of solder to bond pads on a substrate comprising:

placing at least portions of a plurality of balls of solder within a frame and in registered alignment with individual bond pads over the substrate by dipping the substrate into a volume of the balls of solder; and

while the ball portions are within the frame, laser bonding the balls with their associated bond pads by laser bonding the balls to their associated bond pads using a fixed laser beam.

52. The method of claim 51, wherein laser bonding the balls to their associated bond pads comprises fixing the position of a laser beam and moving the frame relative to the laser beam from ball-to-ball.

53. The method of claim 51, wherein:

placing comprises placing individual balls within individual holes within the frame; and

laser bonding the balls to their associated bond pads comprises reflowing the balls by laser bonding while the balls are within their individual holes, and further comprising, after reflowing, removing the frame from around the reflowed balls.

54. A fluxless process for bonding balls of solder to bond pads on a substrate comprising:

placing at least portions of a plurality of balls of solder within a frame and in registered alignment with individual bond pads over the substrate by at least partially immersing the substrate into a volume of the balls of solder; and

while the ball portions are within the frame, laser bonding the balls with their associated bond pads by laser bonding the balls to their associated bond pads using a fixed laser beam.

55. The method of claim 54, wherein laser bonding the balls to their associated bond pads comprises fixing the position of a laser beam and moving the frame relative to the laser beam from ball-to-ball.

56. The method of claim 54, wherein:

placing comprises placing individual balls within individual holes within the frame; and

laser bonding the balls to their associated bond pads comprises reflowing the balls by laser bonding while the balls are within their individual holes, and further comprising, after reflowing, removing the frame from around the reflowed balls.

concluded